Coeur d'Alene Effluent Metals Analysis

August 15, 2012

The City of Coeur d'Alene sampled and analyzed for lead, cadmium, silver, and zinc approximately once a month from January 1, 2000 through May 31, 2012. The 50th, 90th, 95th, and 99th percentile values are summarized Table 1. The figures that follow illustrate the log normal distribution of effluent concentration data.

Table 2 presents the proposed effluent limits in the August 7, 2012 Idaho DEQ pre-draft Section 401 Water Quality Certification for silver, zinc, cadmium and lead in comparison with the historical effluent performance data.

Historical Coeur d'Alene silver and zinc effluent data from January 1, 2000 through May 31, 2012 are less than the proposed average monthly and maximum daily concentration limits in the August 7, 2012 pre-draft 401 certification using the 95th and 99th percentile values of the effluent data. Mass loading limits were calculated at effluent flow rates of 4.2 mgd and 6.0 mgd and are less than the mass loading limits proposed.

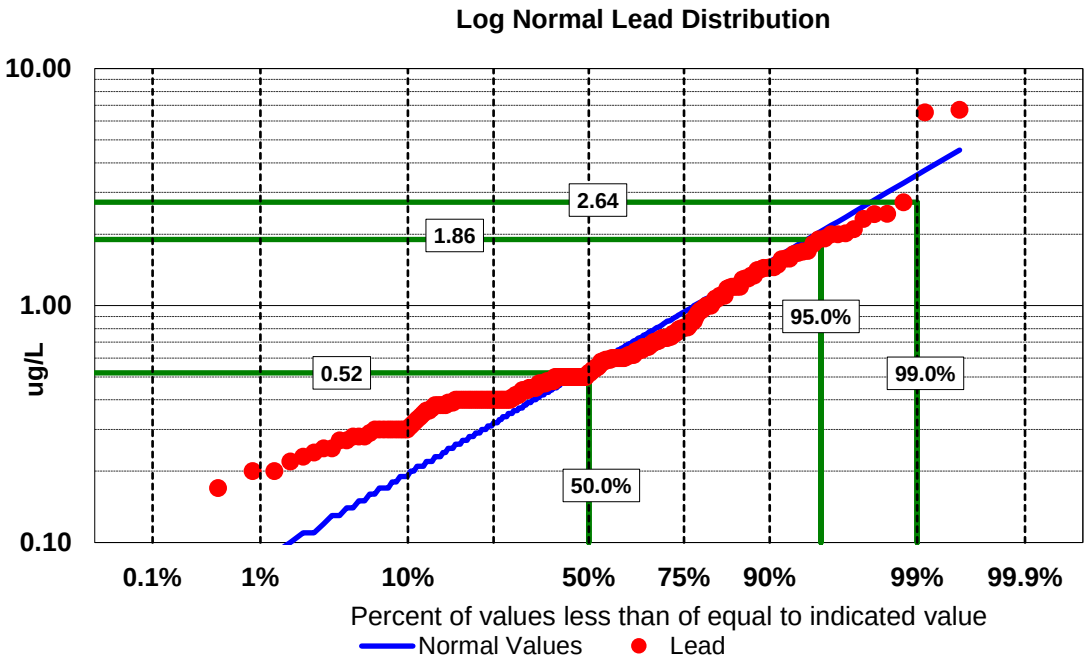
Historical Coeur d'Alene lead effluent data from January 1, 2000 through May 31, 2012 were used to calculate mass discharges at 4.2 mgd and 6.0 mgd and were found to be less than the proposed mass loading limits.

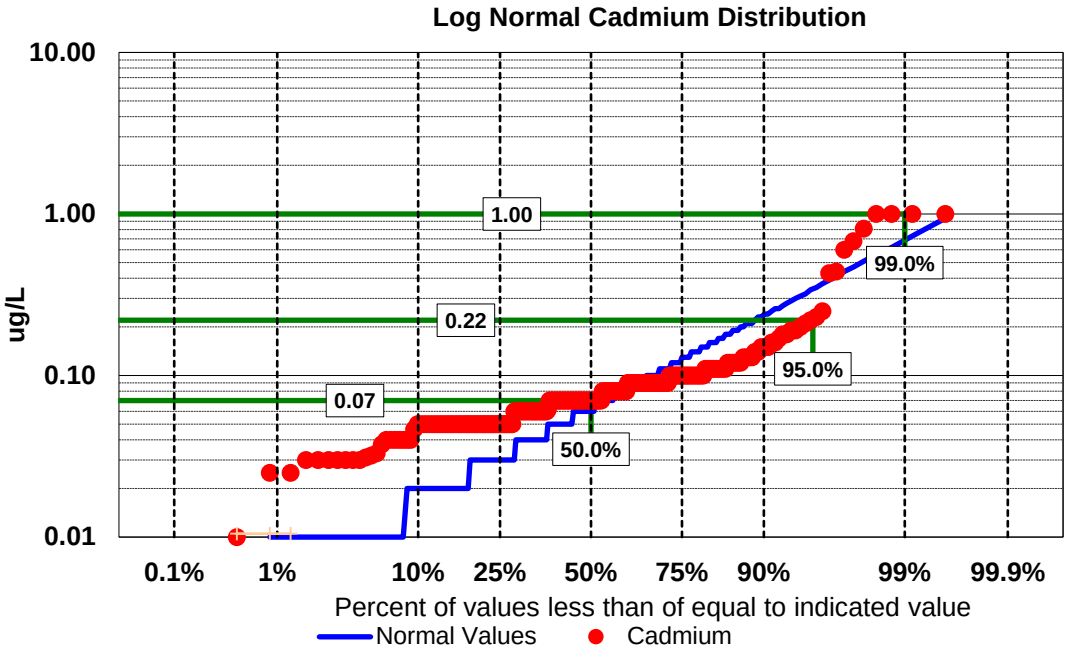
Historical Coeur d'Alene cadmium effluent data from January 1, 2000 through May 31, 2012 were used to calculate mass discharges at 4.2 mgd and 6.0 mgd and were found to exceed the proposed mass loading limits. Allowable effluent concentrations were back-calculated from the proposed effluent mass loading limit at 4.2 mgd (0.21 to 0.27 ug/L) and 6.0 mgd (0.15 to 0.19 ug/L).

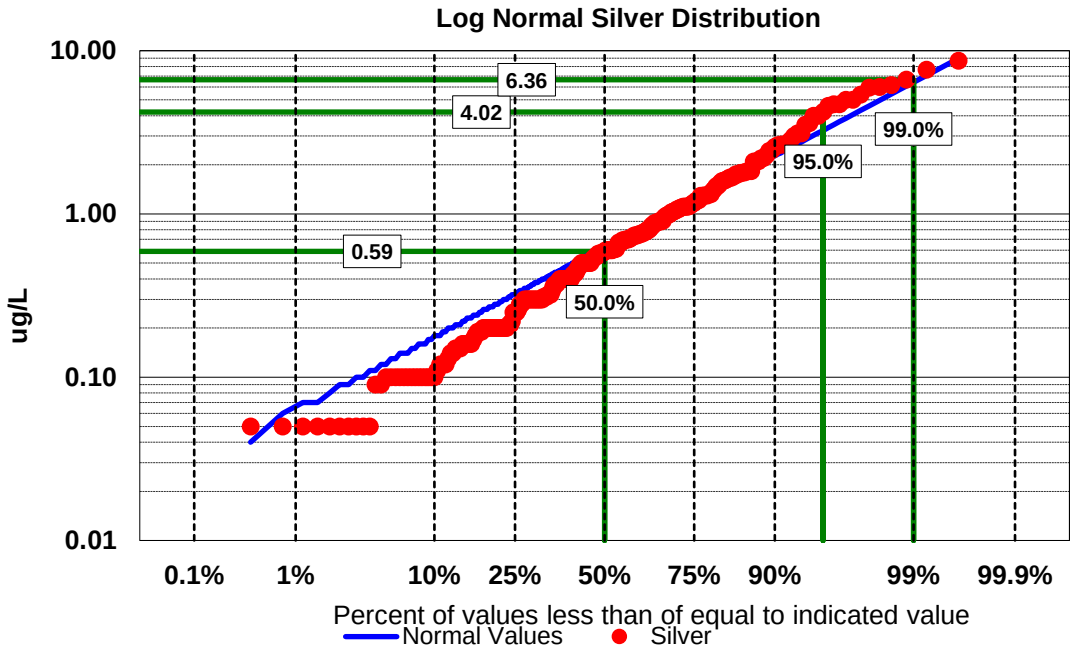
Table 1. Effluent Metals Concentration Statistics, January 1, 2000 through May 31, 2012

Statistics	Lead	Cadmium	Silver	Zinc
	µg/L	µg/L	µg/L	µg/L
50.0 % Percentile	0.52	0.07	0.59	47.8
90.0 % Percentile	1.44	0.15	2.48	63.7
95.0 % Percentile	1.86	0.22	4.02	67.6
99.0 % Percentile	2.64	1.00	6.36	78.1

Maximum recorded effluent concentrations in data set: Lead: 6.71 ug/L, Cadmium: 1.0 ug/L, Silver: 8.68 ug/L, Zinc: 142 ug/L


Log Normal Lead Distribution
10.00
1.00
0.10
ug/L
2.64
1.86
0.52
95.0%
99.0%
50.0%
0.1%
1%
10%
50%
75%
90%
99%
99.9%
Percent of values less than of equal to indicated value
Normal Values
Lead


Log Normal Cadmium Distribution
10.00
1.00
0.10
0.01
ug/L
1.00
0.22
0.07
99.0%
95.0%
50.0%
0.1%
1%
10%
25%
50%
75%
90%
99%
99.9%
Percent of values less than of equal to indicated value
Normal Values
Cadmium



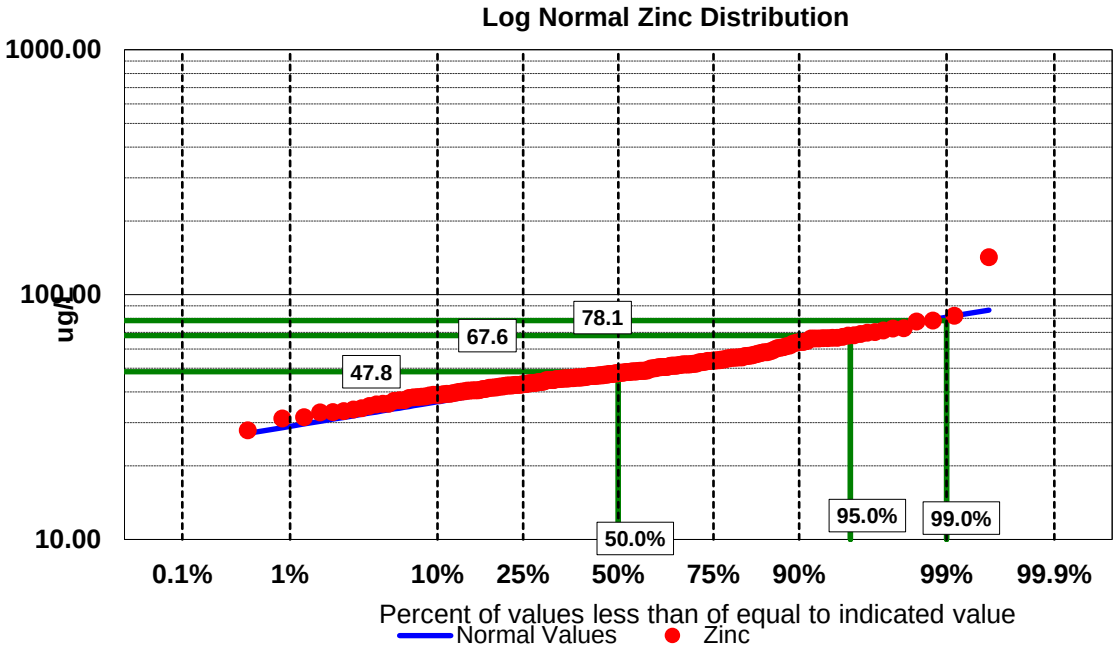


Table 2. Comparison of Effluent Metals Concentration Performance with Proposed Effluent Limits

		Proposed Permit			***Current Permit***		***Change***[1]	
Parameter	*Units*	*Average Monthly Limit*	*Average Weekly Limit*	*Maximum Daily Limit*	*Average Monthly Limit*	*Average Weekly Limit*	*Maxi-mum Daily Limit*	

Pollutants with limits in both the current and proposed permit (continued)								
Silver (Oct-June>4.2 mgd	***µg/L***	***8.01***	***-***	***22.5***	***16.0***	***-***	***31.9***	***D***
	lb/day	***0.401***	***-***	***1.13***	***0.80***	***-***	***1.60***	***D***
Effluent Silver Data Analysis January 1, 2000 through May 31, 2012 (n = 259)					***Comments***			
Median (50th%)	***µg/L***	***0.59***						
95%	***µg/L***	***4.02***			*Existing plant effluent 95th% value is less than proposed Average Monthly Limit*			
99%	***µg/L***			***6.36***	*99th% values is less than proposed Maximum Daily Limit*			
Max Value in Dataset	***µg/L***			***8.68***				
Calculated Mass Discharge								
4.2 mgd (95th% & 99th%)	***lb/day***	***0.14***		***0.22***	*Calculated mass discharge at 4.2 mgd is less than proposed mass limit*			
6.0 mgd (95th% & 99th%)	***lb/day***	***0.20***		***0.32***	*Calculated mass discharge at Future Flow of 6 mgd is less than proposed mass limit*			
Zinc	***µg/L***	***135***	***-***	***168***	***136.2***	***-***	***200.8***	***D***
	lb/day	***6.76***	***-***	***8.42***	***6.8***	***-***	***10.0***	***D***
Effluent Zinc Data Analysis January 1, 2000 through May 31, 2012 (n = 231)					***Comments***			
Median (50th%)	***µg/L***	***47.8***						
95%	***µg/L***	***67.6***			*Existing plant effluent 95th% value is less than proposed Average Monthly Limit*			
99%	***µg/L***			***78.1***	*99th% value is less than proposed Maximum Daily Limit*			
Max Value in Dataset	***µg/L***			***142***				
Calculated Mass Discharge								
4.2 mgd (95th% & 99th%)	***lb/day***	***2.37***		***2.73***	*Calculated mass discharge at 4.2 mgd is less than proposed mass limits*			
6.0 mgd (95th% & 99th%)	***lb/day***	***3.38***		***3.91***	*Calculated mass discharge at Future Flow of 6 mgd is less than proposed mass limits*			
Pollutants with limits only in the proposed permit								
Cadmium[4]	***lb/day***	***0.0075***	***0.0094***	***-***	***-***	***-***	***-***	***nc[4]***
Effluent Cadmium Data Analysis January 1, 2000 through May 31, 2012 (n = 231)					***Comments***			
Median (50th%)	***µg/L***	***0.07***						
95%	***µg/L***	***0.22***			*No concentration limits proposed*			
99%	***µg/L***			***1.0***	*No concentration limits proposed*			
Max Value in	***µg/L***			***1.0***				

Dataset								
Calculated Mass Discharge								
4.2 mgd (95th% & 99th%)	*lb/day*	*0.0077*	*0.035*		*Calculated mass discharge at 4.2 mgd exceeds the proposed mass limits*			
6.0 mgd (95th% & 99th%)	*lb/day*	*0.011*	*0.050*		*Calculated mass discharge at Future Flow of 6 mgd exceeds the proposed mass limits*			
Back Calculated Allowable Effluent Concentration								
4.2 mgd	*µg/L*	*0.21*	*0.27*		*Allowable effluent concentration at 4.2 mgd (~94th% to 96th%)*			
6.0 mgd	*µg/L*	*0.15*	*0.19*		*Allowable effluent concentration at 6.0 mgd (~80th% to89th%)*			
Lead[4]	***lb/day***	***0.13***	***-***	***0.29***	***-***	***-***	***-***	***nc[4]***
Effluent Lead Data Analysis January 1, 2000 through May 31, 2012 (n = 231)					*Comments*			
Median (50th%)	*µg/L*	*0.52*						
95%	*µg/L*	*1.86*			*No concentration limits proposed*			
99%	*µg/L*			*2.64*	*No concentration limits proposed*			
Max Value in Dataset	*µg/L*			*6.71*				
Calculated Mass Discharge								
4.2 mgd (95th% & 99th%)	*lb/day*	*0.065*		*0.092*	*Calculated mass discharge at 4.2 mgd is less than proposed mass limit*			
6.0 mgd (95th% & 99th%)	*lb/day*	*0.093*		*0.13*	*Calculated mass discharge at Future Flow of 6 mgd is less than proposed mass limit*			